

Antibacterial Effect of Silver Diamine Fluoride Incorporated in Fissure Sealants

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Abstract : Introduction: The application of fissure sealants is considered to be an important primary prevention method used in dental medicine. However, the formation of microleakage gaps between tooth enamel and the fissure sealant applied is one of the most common reasons of dental caries development in teeth with fissure sealants. The association between various dental biomaterials may limit the major disadvantages and limitations of biomaterials functioning in a complementary manner. The present study consists in the incorporation of a cariostatic agent – silver diamine fluoride (SDF) – in a resin-based fissure sealant followed by the study of release kinetics by spectrophotometry analysis of the association between both biomaterials and assessment of the inhibitory effect on the growth of the reference bacterial strain *Streptococcus mutans* (S. mutans) in an *in vitro* study. Materials and Methods: An experimental *in vitro* study was designed consisting in the entrapment of SDF (Cariestop^{®} 12% and 30%) into a commercially available fissure sealant (Fissurit^{®}), by photopolymerization and photocrosslinking. The same sealant, without SDF was used as a negative control. The effect of the sealants on the growth of *S. mutans* was determined by the presence of bacterial inhibitory halos in the cultures at the end of the incubation period. In order to confirm the absence of bacteria in the surface of the materials, Scanning Electron Microscopy (SEM) characterization was performed. Also, to analyze the release profile of SDF along time, spectrophotometry technique was applied. Results: The obtained results indicate that the association of SDF to a resin-based fissure sealant may be able to increase the inhibition of *S. mutans* growth. However, no SDF release was noticed during the *in vitro* release studies and no statistical significant difference was verified when comparing the inhibitory halo sizes obtained for test and control group. Conclusions: In this study, the entrapment of SDF in the resin-based fissure sealant did not potentiate the antibacterial effect of the fissure sealant or avoid the immediate development of dental caries. The development of more laboratorial research and, afterwards, long-term clinical data are necessary in order to verify if this association between these biomaterials is effective and can be considered for being used in oral health management. Also, other methodologies for associating cariostatic agents and sealant should be addressed.

Keywords : biomaterial, fissure sealant, primary prevention, silver diamine fluoride

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